



DCODE



Decision Making Constructs in a Distributed Environment

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Definition of Key Terms

- **SHARED** information (**SI**):
 - Information items that are held by all participants in a group decision making environment.
 - CNN reports, products from common search engines, etc.
- **UNIQUE** information (**UI**):
 - Information items that are held by one (or some, but not all) member(s) of the group.
 - Personal information sources, previous experiences, special database access, etc.



Problem Areas

- Literature Review Indicates:
 - People are not very good at sharing UI.
 - Discussion time is spent mostly on SI.
 - When UI is shared with the group, it often has little impact on final decision selection.
 - Weighting is placed on SI



Classic Study (Stasser & Titus, 1985):

Who Should We Admit to Our College?



Condition 1: Everyone has all the information (all SI, no UI)



Condition 2: all info is on table, but distributed across people (some SI, some UI)



Probability of “correct” decision.



.83

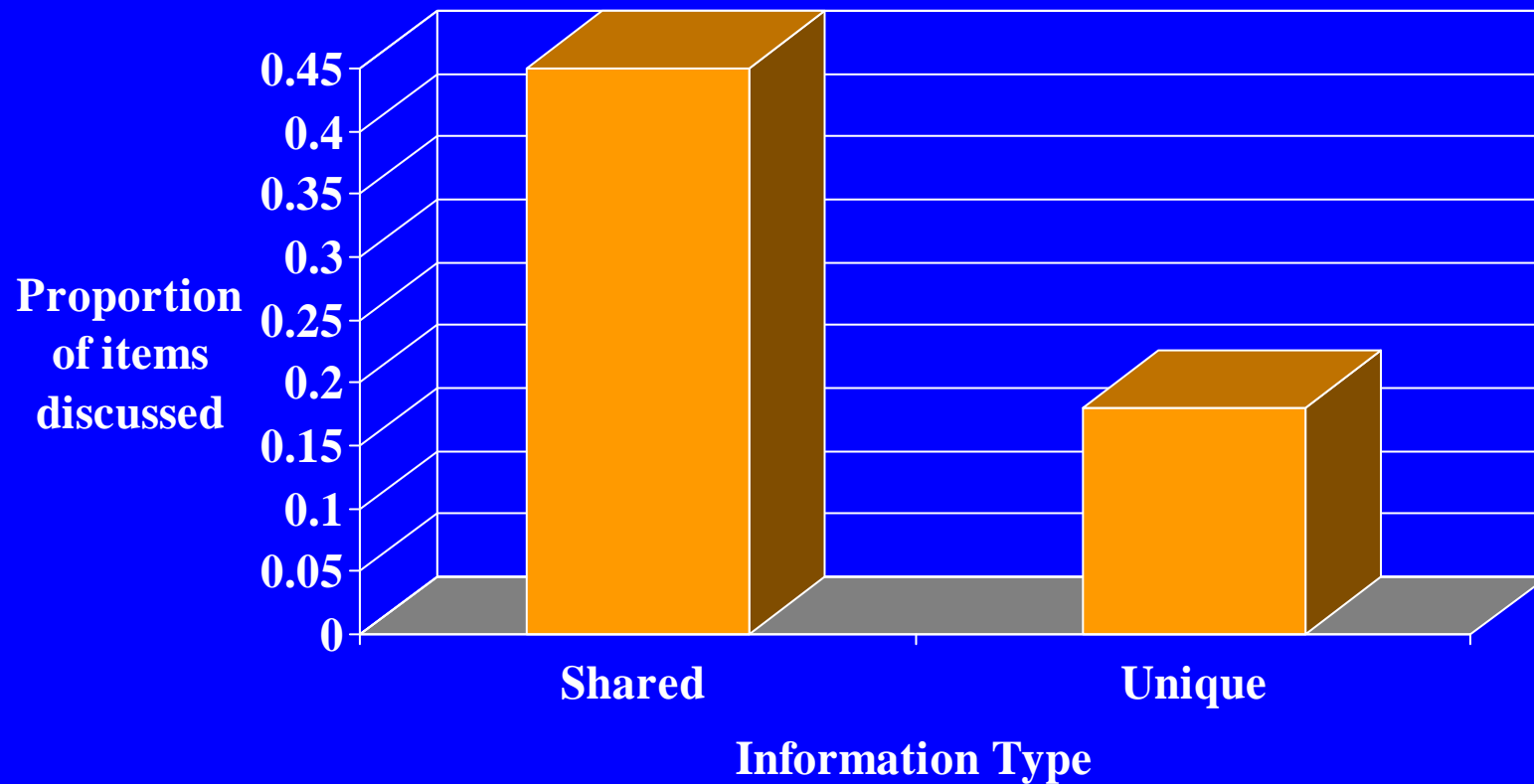


.23



Discussion of SI vs. UI

SI discussion “crowds out” time available for UI



Very Consistent Finding



DCODE Basic Assumption

- In asynchronous collaboration, social factors (prestige, personality, etc.) still play a role

BUT....

- the primary obstacle to effective information exchange is the **cognitive burden** placed upon both the sender and recipient of the information.



Cognitive Burden (sender perspective):

- Is this item **really unique**, and not available to the other participants?
- Is it **important enough** to send?
- Is this the **best** example to send?
- Should I send it **now or await** for further input/confirmation?
- Send it to **all participants**, or just selected subgroup?



Cognitive Burden (receiver perspective).

- I have arriving information items (which I did not develop/find) related to my decision task. I need to determine:
 - **Which particular decision aspect do these items impact?**
 - Cost, Risk, Duration, etc?
 - **What is it's potential influence?**
 - Does it have a positive or negative influence on cost, risk, etc.?
 - **Is this timely information from a credible source?**
 - How recent is this information? What is the source?
 - **Does the information impact the credibility of information items that I am currently using?**
 - If so, what is the overall “domino effect” of this?



DCODE Objectives:

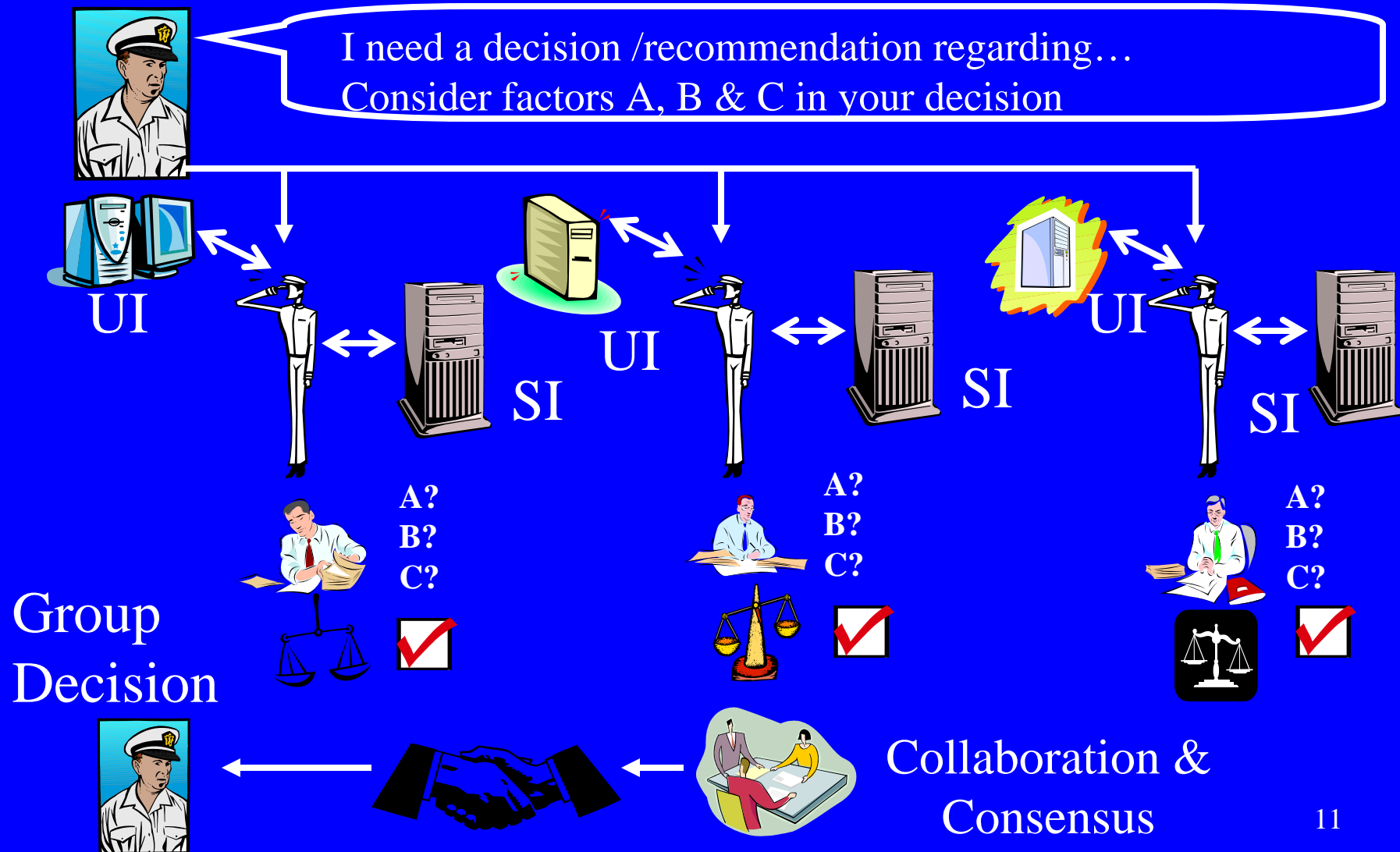
- Overall:
 - Enhance the ability of asynchronously distributed group decision makers to share their UI...
 - Improve overall group decision quality through the effective integration/weighting of shared UI items...
 - without imposing an excessive cognitive burden
- This Year:
 - Expand conceptual model designed to address these issues
 - Experimental verification of selected model concepts
 - Interface with EWALL technologies



Expected Final Products

- A collaborative software suite that includes
 - Simplified **Knowledge Elicitation technologies** for adding (tagging) individual information evaluation parameters.
 - **Group database browsers** for finding/sharing UI
 - **Ewall-type** interface for using this tagged information to:
 - Assist a team member make a decision/recommendation
 - Assist the group in reaching final overall consensus

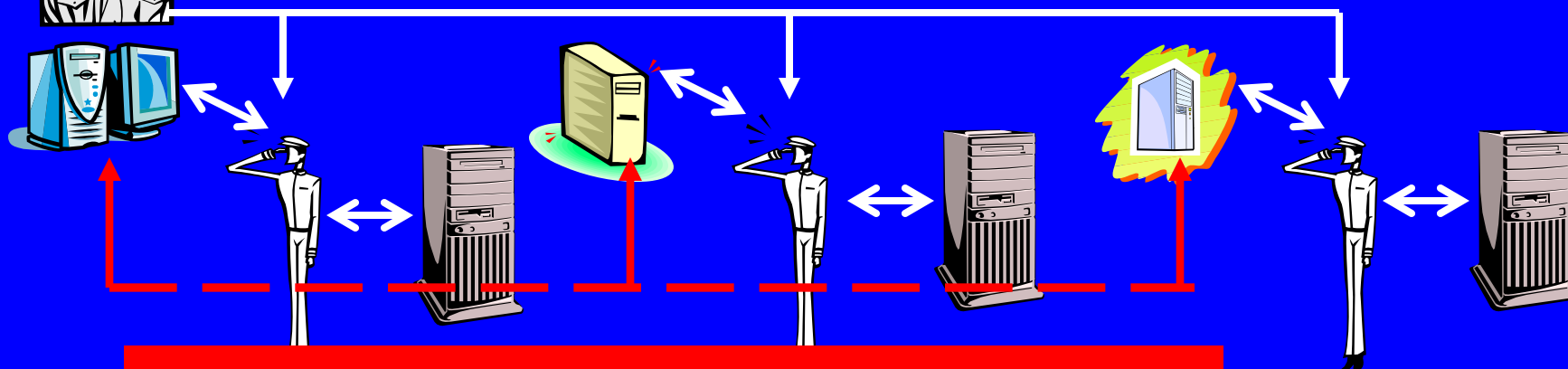
Decision Process Flow Model



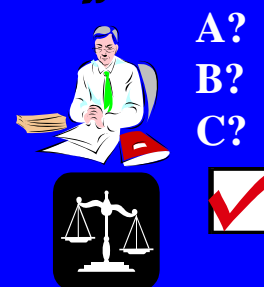
DCODE Research Issues



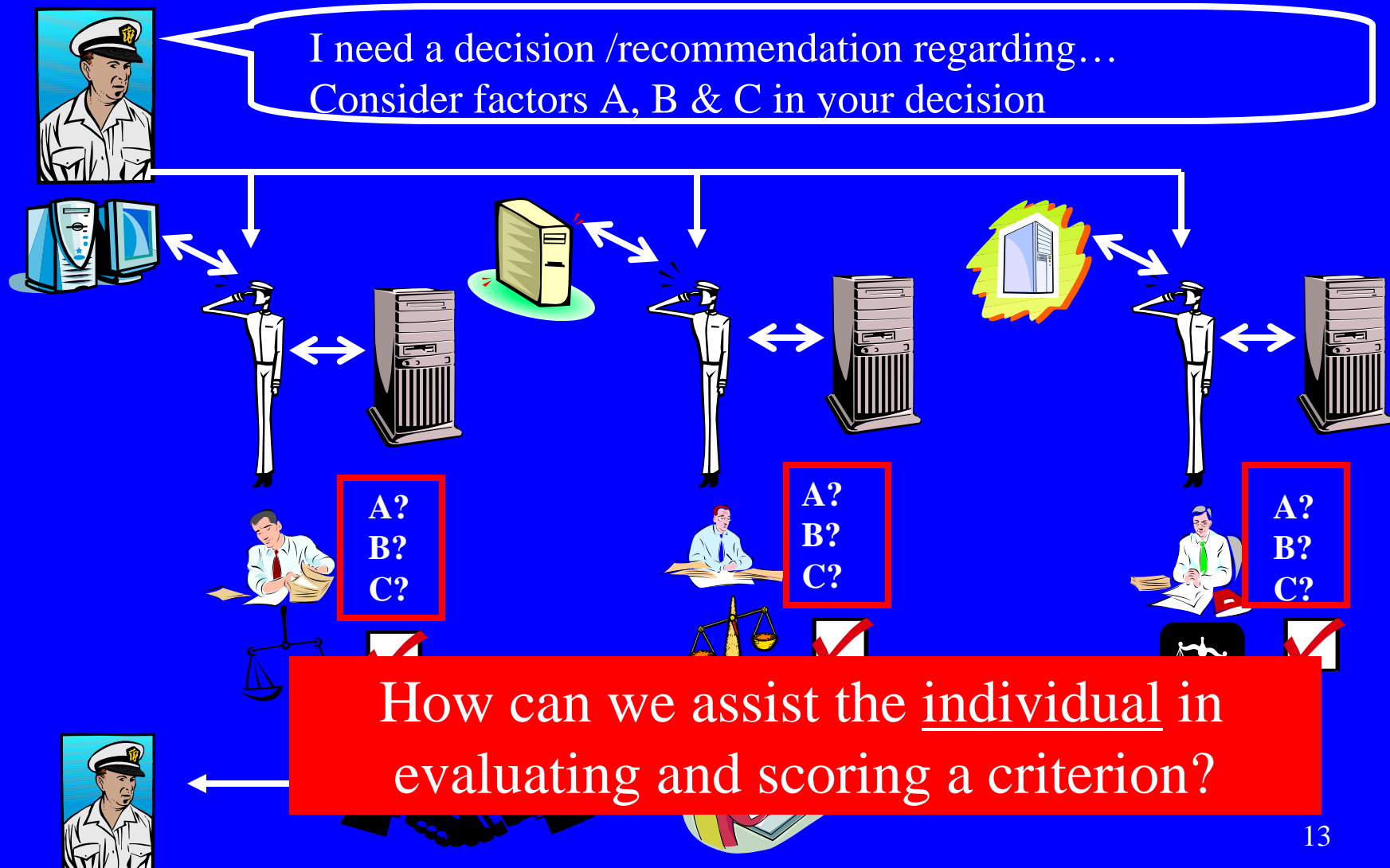
I need a decision /recommendation regarding...
Consider factors A, B & C in your decision



How do we give participants access to unique information held by others?



DCODE Research Issues



DCODE Research Issues



I need a decision /recommendation regarding...
Consider factors A, B & C in your decision

How can we assist the individual in reaching an overall recommendation?



A?
B?
C?



A?
B?
C?



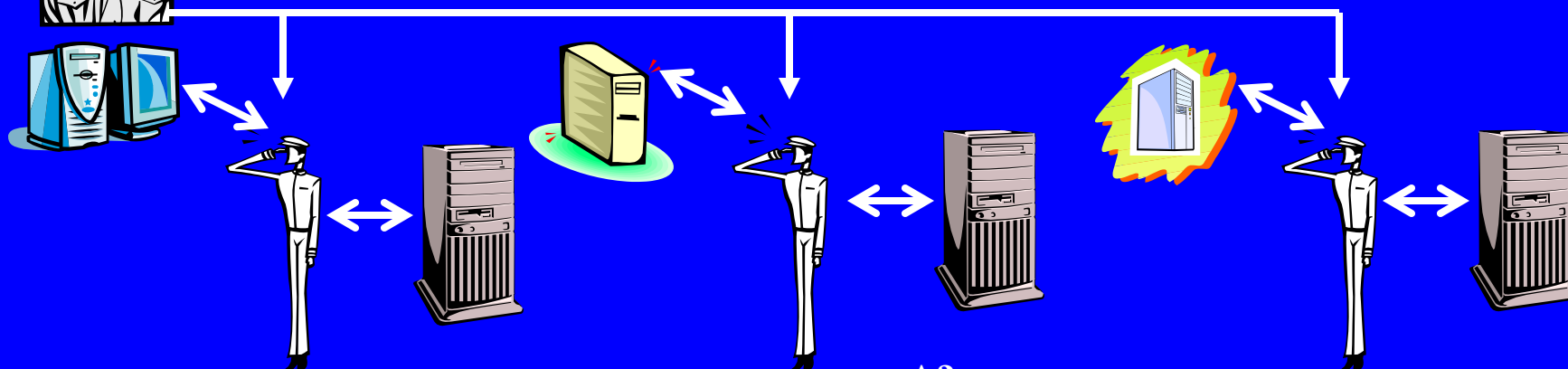
A?
B?
C?



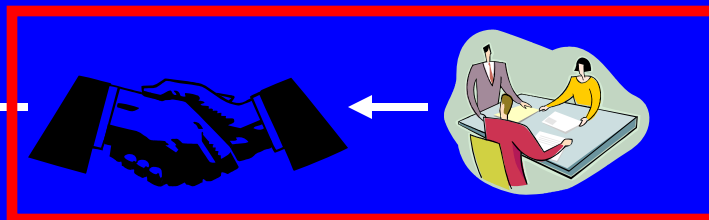
DCODE Research Issues



I need a decision /recommendation regarding...
Consider factors A, B & C in your decision



How can we assist the GROUP in reaching an overall consensus?





Research Questions



How can we assist the individual in evaluating and scoring a criterion?

- The analyst sorts and structures incoming information items (belongs to A or B or C)
- The analyst assigns his subjective evaluation to specific information content (a knowledge elicitation, “tagging” process). Parameters might include:
 - Importance
 - Information impact (positive or negative)
 - source credibility
 - timeliness, etc.



EWALL News Capture

Fading time line (soon by priority/relevance)

C
a
t
e
g
o
r
y

View Help

	12:25 PM	11:45 AM	11:05 AM	10:26 AM	
World	 CNN: PRAGUE, CZECH REPUBLIC:	 CNN: MANAGUA, NICARAGUA: Study to probe	 CNN: MIDDLEBURY, INDIANA: 2nd	 CNN: LA CORUNA, SPAIN: Fishermen face	 CNN: MIDDLEBURY, INDIANA: FBI: 2nd
US	This is relevant				
	 CNN: ISLAMABAD, PAKISTAN:				
UK	 CNN: JERUSALEM: New Israeli Labor leader				
	 CNN: PRAGUE, CZECH REPUBLIC:				
	 CNN.com				
	 CNN: WASHINGTON: Sniper shootings				
	 CNN: BLOOMINGTON, INDIANA: Indiana				
	 CNN: BLOOMINGTON, INDIANA:				
	 CNN: WASHINGTON: Sniper suspect's				
	 CNN: YACOLT, WASHINGTON: Snake kiss tums				
	 BBC: Diana paparazzi face privacy trial				
	 BBC: Wales win again				
	 BBC: Police to attend 'illegal' autopsy				



Expansion



Item has:

Source

URL

Time date

Title

Summary

Body

But It needs:

which category...?

Importance (hi-lo)

Impact (Pos/Neg)

Credibility (good/bad)

Timeliness (new/old)

The screenshot shows a Netscape browser window displaying the CNN.com/WORLD page. The main article is titled "Nicaragua to study banana pesticide claims" with a sub-headline "Allegedly exposed, workers want U.S. corp". The article text states: "MANAGUA, Nicaragua (AP) -- The Nicaraguan government agreed Tuesday to form an interagency commission to study the plight of thousands of banana workers who claim they were exposed to harmful pesticides while working at U.S.-owned fruit plantations in the 1970s." Below the text is a photo of a large group of people marching. A caption reads: "More than 2,000 former banana workers march Tuesday in Managua to demand compensation for exposure." The left sidebar contains a "GO" search bar, a "Rent DVDs Online" advertisement, and a "SERVICES" menu with options like Video, Newswatch, and E-Mail Services. The right sidebar has a "Set up Sports A" link, a "Start Free Trial" link, and a "Want more articles like this one?" section with a keyword search bar.



Each item has two types of information



**ID/Tracking and
Content parameters
(no real disagreements)**

Source
URL
Time date
Title
Summary
Body

**Subjective, decision
relevant information
analysis/evaluation....
(disagreements expected)**

Relates to...?
Importance (hi-lo)
Timeliness
Influence (Pos/Neg)
Credibility (good/bad)



Each information item (“card”)

ID

A
n
a
l
y
s
i
s

CNN	World	12:25 PM	PRAGUE, CZECH REPUBLIC: Protesters call for NATO's end	1:44 PM
Category: A/B/C/ Cost/Risk/Duration				
Importance:				
Impact				
Credibility				



Proposed knowledge elicitation schema for analysis of information items

Worst
Lowest
Least
Most Negative

Best
Highest
Most
Most Positive

**Goal: Minimum
Cognitive Burden**

Poor end
of scale



Good end
of scale

Average
Neutral
Middle
Indifference

Cannot determine
Unknown
Review Later



The knowledge elicitation “tagging” process

“The Rangoon Times reports unconfirmed rumors that the Minister of the Interior has resigned today after the tragic collapse of the newly constructed bridge at...”

Criteria:	Political Stability					
Importance:					X	??
Impact:	X					??
Credibility:			X			??
Certainty:		X				??
Timeliness:				X		??

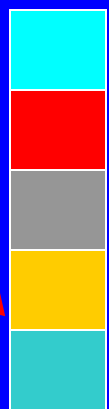
Save



Saved Information item # PS3

(can also be viewed as EWALL “card”)

Political Stability item #PS3



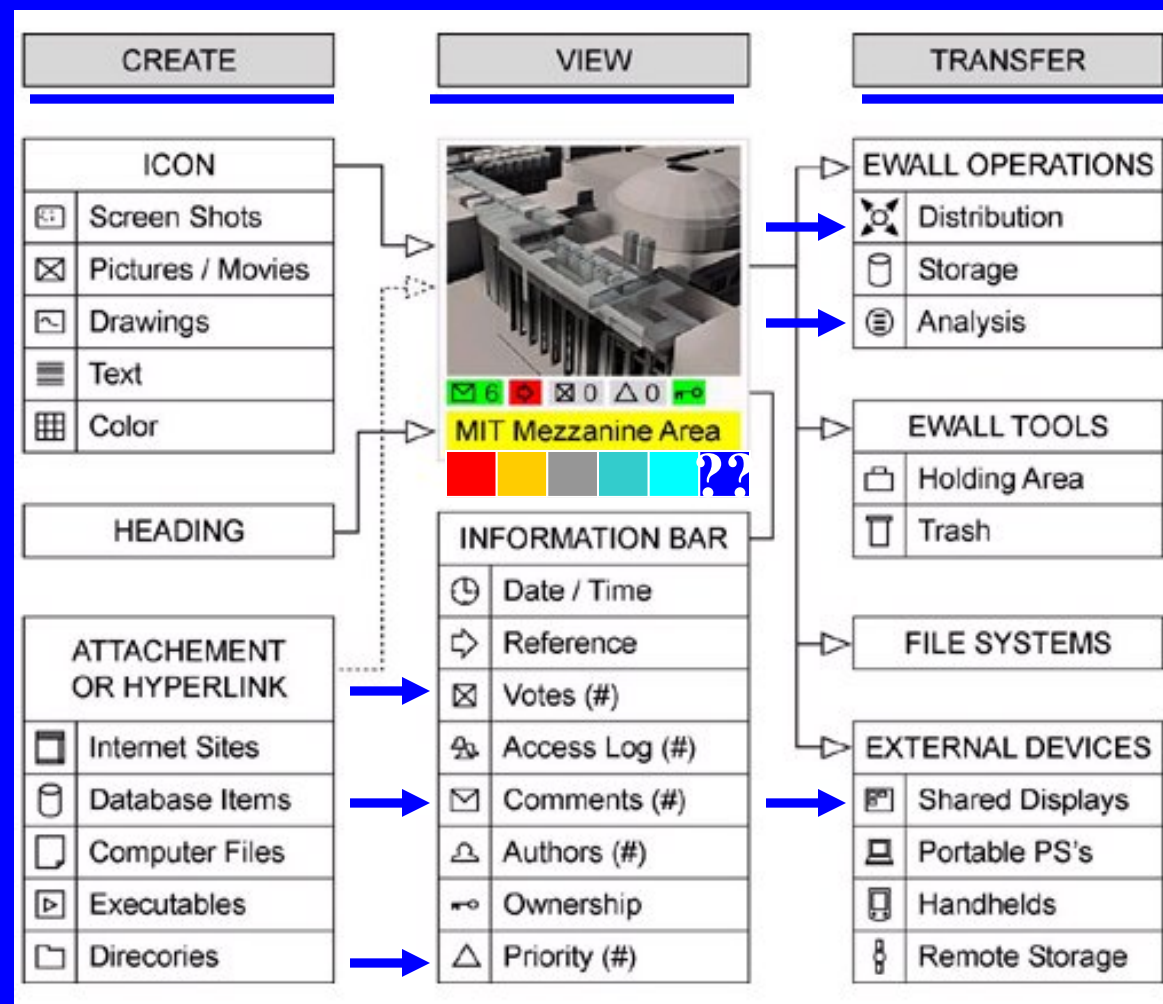
Impor
Impct
Cred
Cert
Time

“The Rangoon Times reports unconfirmed rumors that the Minister of the Interior has resigned today after the tragic collapse of the newly constructed bridge at...”

Information
Analysis

Short Descriptor

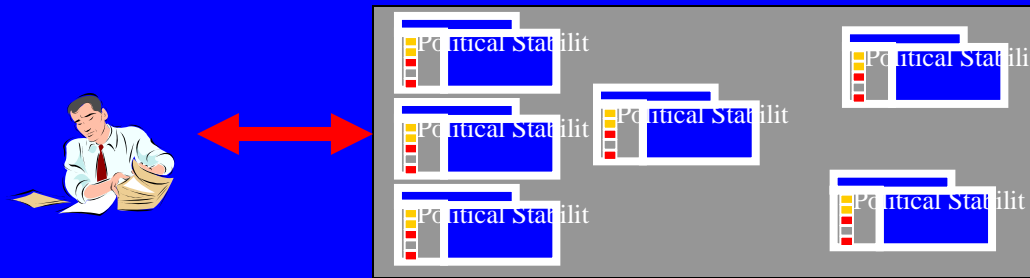
EWALL Structure*



*Paul Keel, MIT

How can we assist the individual in evaluating and scoring a criterion?

Analyst uses interface to EWALL technology to evaluate each criterion



Political Stability Items

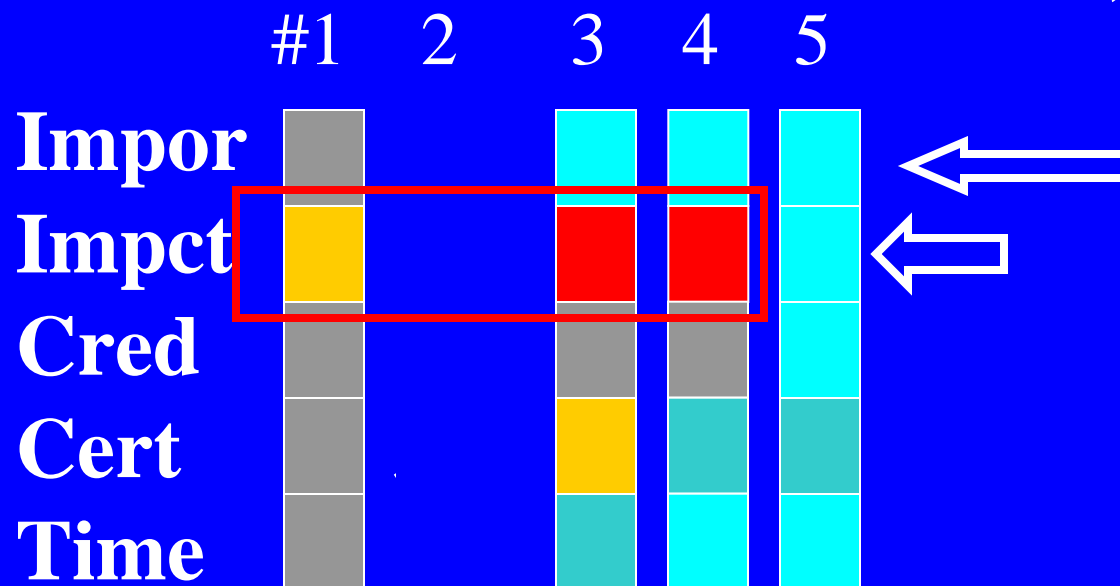
The EWALL algorithms uses the tagged information to sort, rank, link (whatever the user specifies) the items into a meaningful framework for analysis and final criterion evaluation/scoring



Analyst uses EWALL technology to evaluate criterion



Political Stability Summary (5 items for each of five criteria)







Political Stability Rating:

How can we assist the individual in reaching an overall recommendation?

Same as before except now the items/cards represent his evaluation score assigned to each criterion






Scoring of four selection criteria






Political Stability	
Cost (use of assets)	
Duration of Ops	
Local Security	






Individual Recommendation: NO 






How do we give participants access to uniquely held information?

My PS Items






Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	






Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	






Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	






Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	

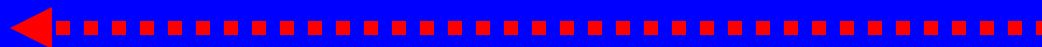
Other analyst's PS items

Political Stability item xxx	
 Impor	“The Rangoon Times reports unconfirmed rumors that the Minister of the Interior has resigned today after the tragic collapse of the newly constructed bridge at...”
 Impet	
 Cred	
 Cert	
 Time	

Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	

Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	

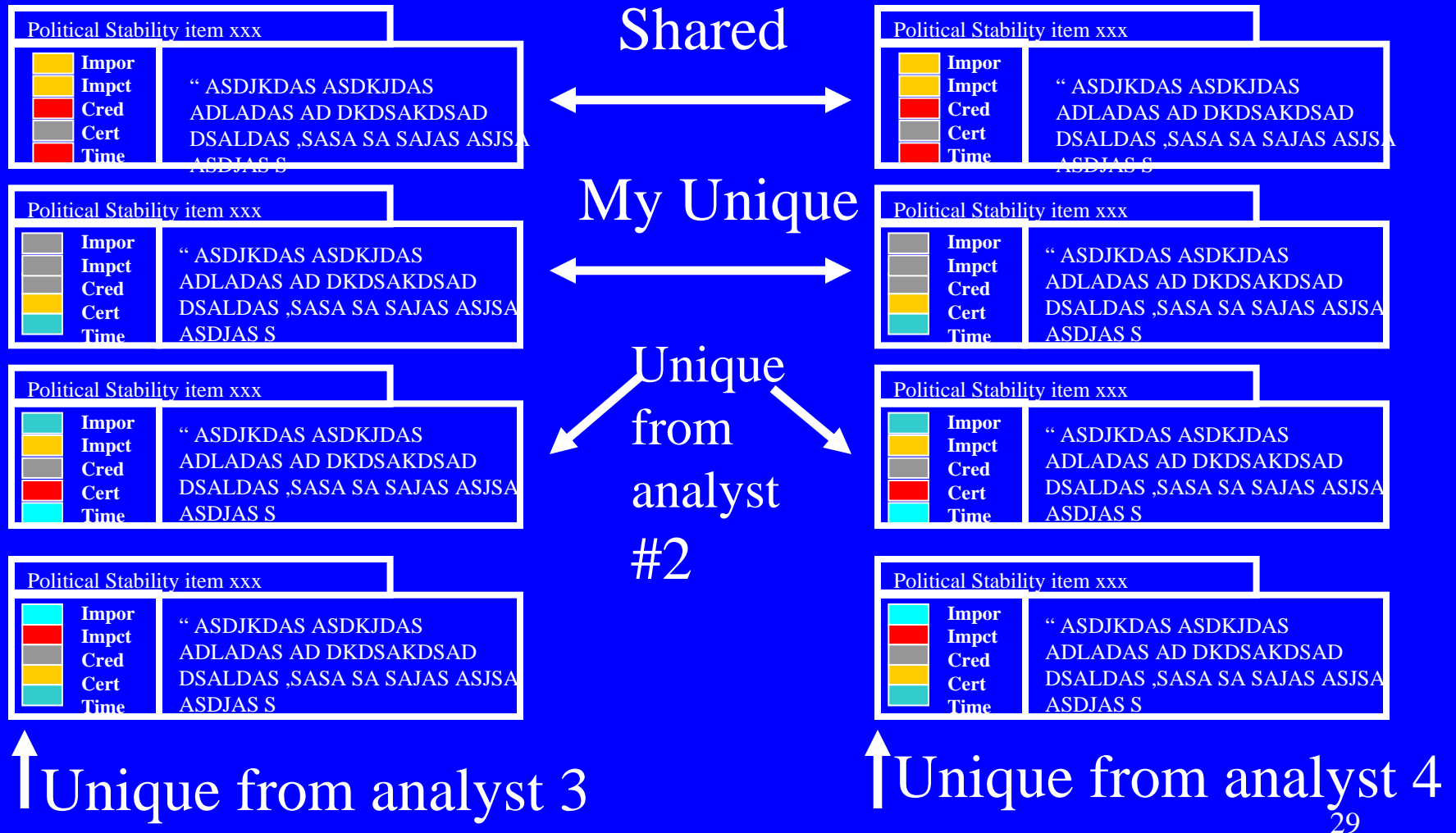
Political Stability item xxx	
 Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
 Impet	
 Cred	
 Cert	
 Time	



Send me non-duplicative items rated Important



My Full Array of Information Items





With Transfer of Unique Items:

The item content and scoring is transferred...

but scoring can be modified by recipient.

Unique
from
analyst
#2

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

Political Stability item xxx

Impor	
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

Political Stability item xxx

Impor	ASDJK
Impet	ADSKJDAS
Cred	ADLADAS AD DKDSAKDSAD
Cert	DSALDAS ,SASA SA SAJAS ASJSA
Time	ASDJAS S

↑ Unique from analyst 3

↑ Unique from analyst 4



ALL the Analysts have the same array of PS items



Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
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Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
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Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

Political Stability item xxx

Impor	“ ASDJKDAS ASDKJDAS ADLADAS AD DKDSAKDSAD DSALDAS ,SASA SA SAJAS ASJSA ASDJAS S
Impet	
Cred	
Cert	
Time	

THIS is what differs



At this point...

- There has been **NO** collaboration between participants
 - exchange of UI was assumed to be an automated database search process on tagged information items
 - Tagging and EWALL technology have been used to make **individual** judgements/decisions
- (When in an asynchronous mode, a large amount of the information is processed/analyzed independently)
- But, the final **GROUP** recommendation requires...
 - collaboration
 - consensus building



Collaboration is via shared/networked EWALL display

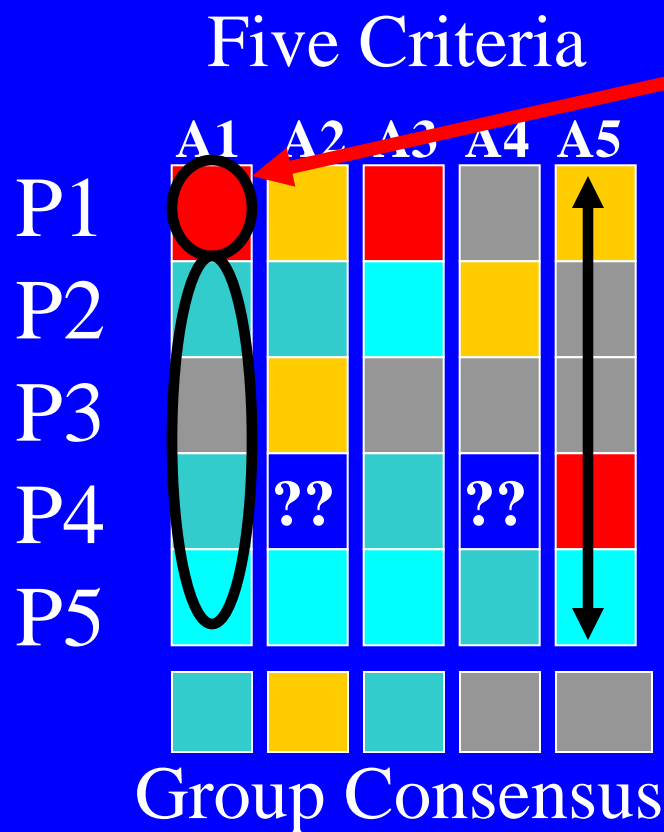
- If the UI exchange process has been successful, all the participants are using the **same information items**
- Differences in scoring is on the individual **interpretation** of the information items
- Individual interpretation is reflected in the **tags assigned** by each participant and
 - can serve as a focus for group discussion
 - forms a framework for consensus building



Reaching Group Consensus on Criterion Scores



Five Decision Criteria (“A”), Five Participants (“P”)



P1 scores on criterion A1



Where, precisely, do we disagree?

How can we assist the Group in reaching an overall consensus/recommendation?

EWALL items now become the group criteria scores

Group scoring of decision criteria

A1: Political Stability 

A2: Cost (use of assets) 

A3: Duration of Ops 

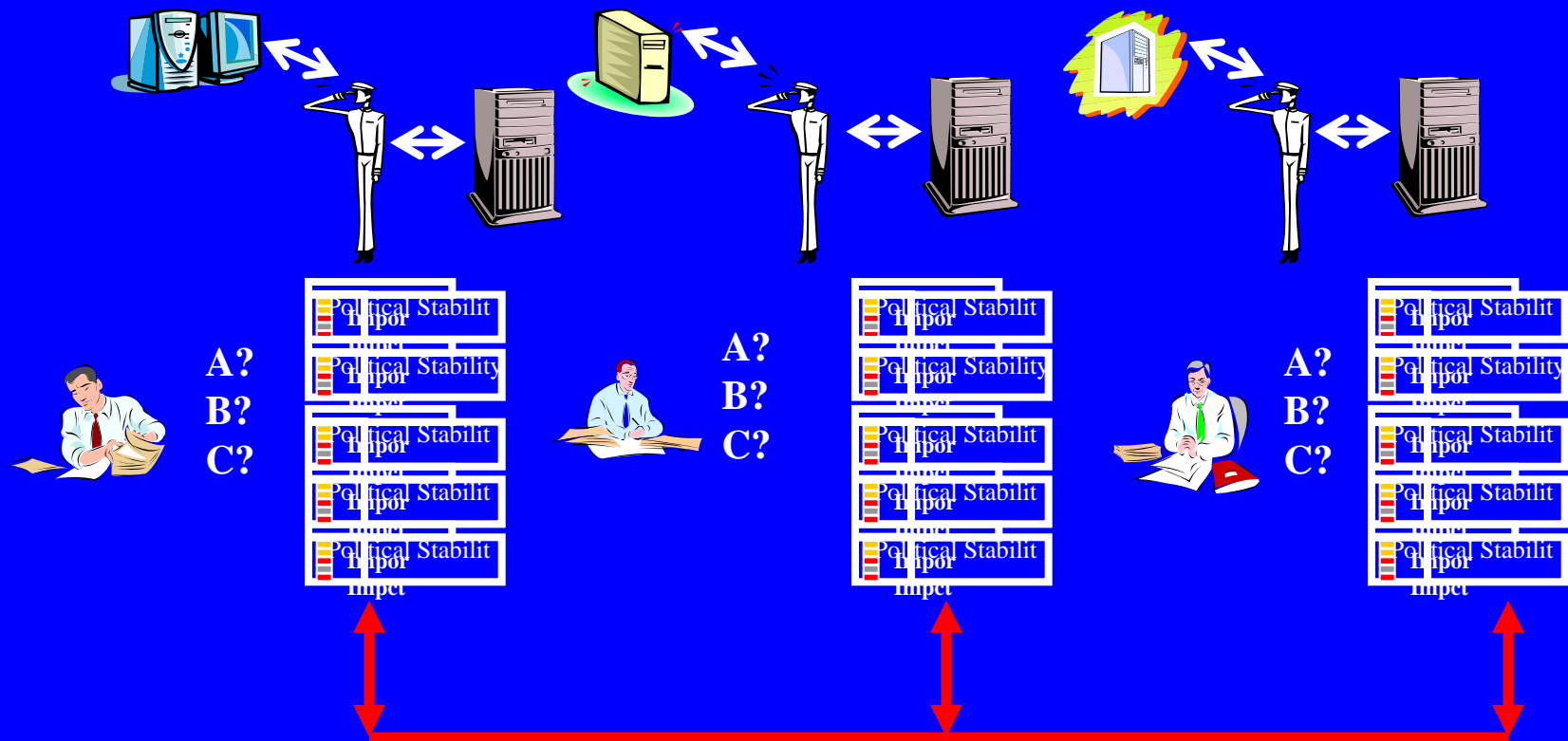
A4: Local Security 

A5: Infrastructure 

Consensus Overall Recommendation:

Mild Endorsement 

Decision Flow Model (Revised)

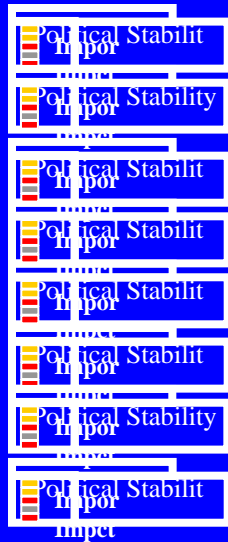


Unique Items are shared



Decision Flow Model (cont.)

Each participant has
a uniform pool
of items



A?
B?
C?
all?

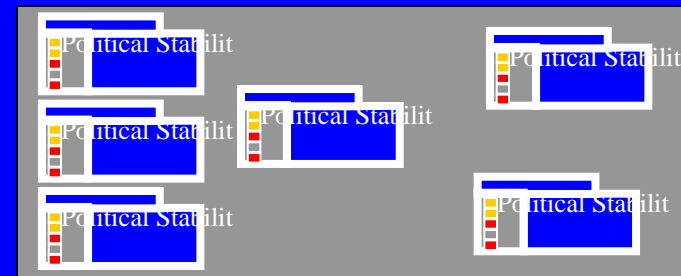
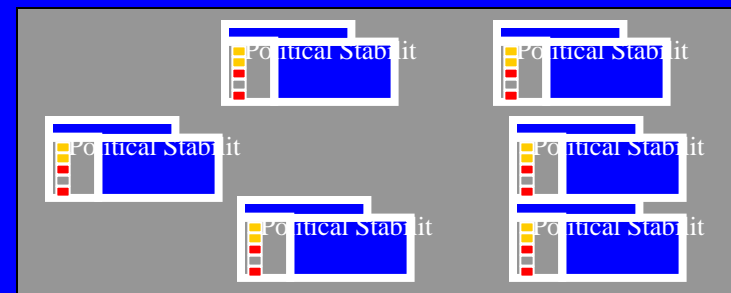
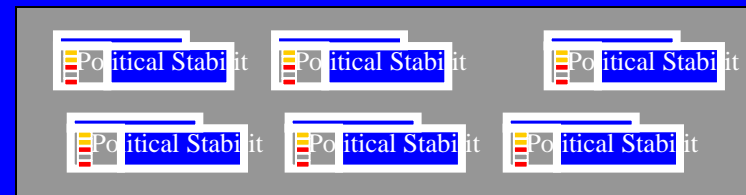


A?
B?
C?
All?



A?
B?
C?
All?

EWALL Technology

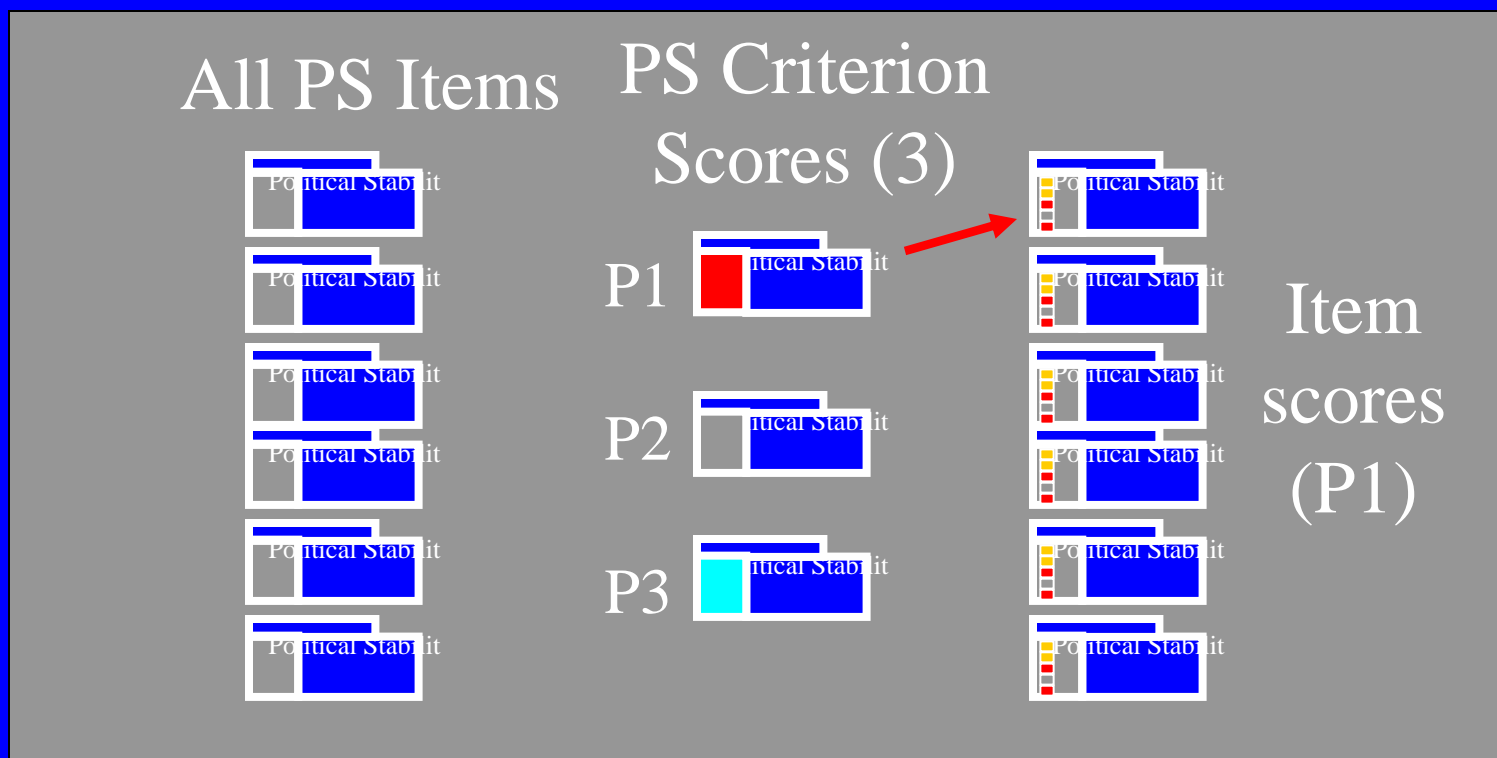




Collaboration & Consensus Building (PS Criterion)



Networked EWALL Computer Display

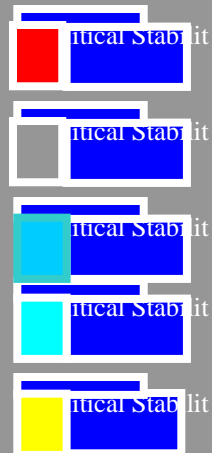


Group Overall Decision

Networked EWALL Computer Display



Group Criteria
Scores



P1

Overall
Scores (3)



P2



P3





Completed Experiments

- Two experiments completed in FY02
- Primary focus was on what type of information the subject would request to reconcile differences with the “group”
- Subjects focused on maximum discrepancies with “other group members” vice attempting to move mid-point scores to a consensus
- One experiment showed significant preference for looking at scores higher than their own (i.e. more positive)
 - second experiment showed opposite result

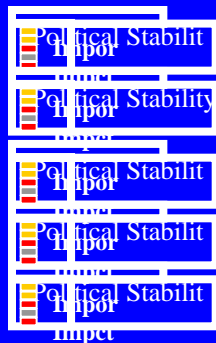


Planned Experiment

- **Structure & Tagging Experiment**
- Design/software completed, pilot subjects tested
- Experiment is on-line, internet based
 - At <http://64.66.5.34:8080/dcode>
- Expect to use Ss at NPS, run Jan/Feb.

Experimental Design Overview

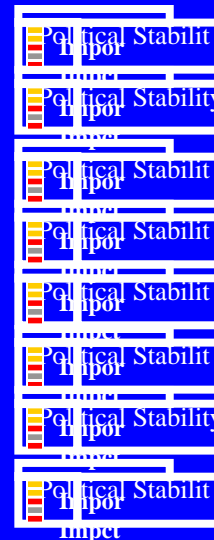
Original Pool
of Items



A?
B?
C?
all?

Phase I

Composite pool
of items (UI+SI)



A?
B?
C?
all?

Phase II

Research Question:

Does the manner in which these are displayed,
influence the accuracy of the revised assessment?



Structure & Tag Experiment



- Subject sees 12 information items
 - 4 Criteria, 3 information items per Criterion
 - Scores all the criteria, plus an overall score
 - Then sees 10 new items which are UI from other members (e.g. automated browser search)
 - UI creates **hidden profile** situation, i.e. Negative changes to Positive with information pooling
 - Then scores his constructs again after seeing the UI
- Three Presentation Modes (Between Ss variable)
 - Randomized lists of the 12 and the 12+10 items
 - The 12 and 12+10 item lists are grouped (but not tagged)
 - The 12 and 12+10 item lists are grouped and tagged



Impact of UI Information

	First 12 items	Add the 10 UI items
Criterion 1	2 NEG 1 POS “NEG”	2 NEG 4 POS “POS”
Criterion 2	2 NEG 1 POS “NEG”	2 NEG 4 POS “POS”
Criterion 3	2 NEG 1 POS “NEG”	4 NEG 1 POS “Strong NEG”
Criterion 4	2 POS 1 NEG “POS”	4 POS 1 NEG “Strong POS”
Overall Score	NEG	POS



List Condition (First 12)

"....The major ports of Islandia are less than three days sailing from our major disaster recovery supply center at Naha. Naha also has three supply ships that are permanently loaded to be used in quick response assistance...."

"....Islandia Security Forces are used to working in small independent groups, and as such have never really developed expertise in larger scale command and control operations such as this camp would require. There is some question as to whether they will be able to effectively perform a mission of this large scale...."

"....The Huan Construction Company announced last month that it had completed all the work on Aurgon, Islandia's major airport. The major impact of this construction is that the airport will now be able to handle even the largest commercial and military jet aircraft...."

"....Our Ambassador to Islandia been at that job longer than any other in the region, and has a very good relationship with all levels of the Islandia government. This should assure that any negotiations between us and Islandia would go very quickly and without any major difficulties...."

"....A detailed report on both the primary and secondary roads in Islandia indicates that within and between all the major cities, almost all of the primary roads are four lanes. The vast majority of the secondary roads are good quality two-lane highways...."

"....In the past eighteen months, a number of large manufacturing plants have opened in Islandia. As a consequence, the unemployment rate is quite low. Some companies have reported difficulties in attracting a local labor force, and some have been forced to bring in foreign workers...."



Scoring the information

Please assign scores to each of the following factors		
INFRASTRUCTURE	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
LABOR POOL	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
SECURITY	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
IMPACT ON US	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
Overall Rating	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High

Score

Confidence

Overall



Generic KE design was not used



- KE design had not been finalized during software development.
- Felt a finer degree of granularity might be needed to highlight differences (7-pt. Scale vs. 5-pt. Scale)
- Only one tagging parameter (impact, pos-neg) was used for tagged condition.



List Condition: UI Items (appended to end of list)

"....Last year a World Bank survey listed Islandia's labor force as having the highest literacy rate of any country in the region. This has been true for the last nine annual surveys, and it attributed to Islandia's emphasis on giving every child access to a free education...."

"....Members of Islandia's Security Forces are hand picked by government agencies. As such, the members feel strong allegiance to the central government. Their loyalty to the government and their immediate compliance to government orders and directives has never been an issue. They do as they are ordered by the Islandia government...."

"....The Security Force proposed for the camp is of adequate size but there is concern that should another emergency appear--and with the oncoming monsoon season, that is a strong possibility--the Security Forces would not be able to cover both the camp and the other disaster. In that case, the Islandia government would almost assuredly give top priority to the new disaster, leaving the camp with insufficient protection...."

"....The Islandia News reported the two Northern Provinces experienced a six-hour loss of electric power during the night. This is the seventh time this month that there has been a prolonged power loss, indicating that Islandia has still not solved its chronic problem of failing to have a reliable power grid system in any part of the country other than the Capital region...."

"....The most recent issue of the Asian Times carries an excerpt from a Doctors Without Borders report highlighting the serious sewer/waste disposal conditions they found in rural Islandia. Many of the large sewer pipes/drains were found to be old and leaking, and, if not repaired quickly by the government, these medical personnel felt there could be serious health issues...."

"....A cultural tradition in Islandia is that each worker is given a single two month vacation each year, which he can take any time during the year. All the employee has to do is give the employer a one week notice before going on vacation. This has caused unexpected and disrupted work shortages when several employees elect to take the vacation at the same time...."

"....With the Islandia government supplying the bulk of the Security Forces, we should have to send only a minimum number of our uniformed military to the camp. This would therefore have virtually no effect on the ability of our command to respond to some new, unplanned crisis...."

First 12

Next 10



Scoring the information again after seeing UI items



Please assign scores to each of the following factors		
INFRASTRUCTURE	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
LABOR POOL	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
SECURITY	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
IMPACT ON US	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High
Overall Rating	Score	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 No Neutral Yes
	Confidence	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 Low Mid High



Which UI items were most important?



Reference Window

First:

Second:

Third:

1. "....The most recent issue of the Asian Times carries an excerpt from a Doctors Without Borders report highlighting the serious sewer/waste disposal conditions they found in rural Islandia. Many of the large sewer pipes/drains were found to be old and leaking, and, if not repaired quickly by the government, these medical personnel felt there could be serious health issues...."

2. "....A cultural tradition in Islandia is that each worker is given a single two month vacation each year, which he can take any time during the year. All the employee has to do is give the employer a one week notice before going on vacation. This has caused unexpected and disrupted work shortages when several employees elect to take the vacation at the same time...."

3. "....With the Islandia government supplying the bulk of the Security Forces, we should have to send only a minimum number of our uniformed military to the camp. This would therefore have virtually no effect on the ability of our command to respond to some new, unplanned crisis...."

4. "....Pacific Telecommunications reports that it has failed to come to agreement with the government of Islandia regarding establishing more telephone lines in the rural areas of the country. Aside from the Capital region, Islandia ranks as one of the worst countries in the region in terms of phones per capita and has no cellular phone system at all...."

5. "....Our intelligence reports no terrorist or anti-government activity in Islandia over the past decade. The government is strong with no militant opposition parties. This should ensure that our troops stationed in the camp are in minimal danger of outside attack...."

← The 10
UI items

We would
expect he selects
the hidden profile
reversal items



Grouped Condition: First 12



*** INFRASTRUCTURE ***

"...The Huan Construction Company announced last month that it had completed all the work on Aurgon, Islandia's major airport. The major impact of this construction is that the airport will now be able to handle even the largest commercial and military jet aircraft...."

"...A detailed report on both the primary and secondary roads in Islandia indicates that within and between all the major cities, almost all of the primary roads are four lanes. The vast majority of the secondary roads are good quality two-lane highways...."

"...The Islandia News reported the two Northern Provinces experienced a six-hour loss of electric power during the night. This is the seventh time this month that there has been a prolonged power loss, indicating that Islandia has still not solved its chronic problem of failing to have a reliable power grid system in any part of the country other than the Capital region...."

*** LABOR POOL ****

"...In the past eighteen months, a number of large manufacturing plants have opened in Islandia. As a consequence, the unemployment rate is quite low. Some companies have reported difficulties in attracting a local labor force, and some have been forced to bring in foreign workers...."

"...Last year a World Bank survey listed Islandia's labor force as having the highest literacy rate of any country in the region. This has been true for the last nine annual surveys, and it attributed to Islandia's emphasis on giving every child access to a free education...."

"...Worker productivity in Islandia has been difficult to assess due to their record keeping methods and governmental control over the release of the data. However, a recent survey of multinational companies with plants in Islandia indicates that they feel their plants in Islandia are always among their most productive...."

Items
grouped
by criteria



Grouped Condition: UI items appended to end of category list

*** INFRASTRUCTURE ***

"....The Huan Construction Company announced last month that it had completed all the work on Aurgon, Islandia's major airport. The major impact of this construction is that the airport will now be able to handle even the largest commercial and military jet aircraft...."

"....A detailed report on both the primary and secondary roads in Islandia indicates that within and between all the major cities, almost all of the primary roads are four lanes. The vast majority of the secondary roads are good quality two-lane highways...."

"....The Islandia News reported the two Northern Provinces experienced a six-hour loss of electric power during the night. This is the seventh time this month that there has been a prolonged power loss, indicating that Islandia has still not solved its chronic problem of failing to have a reliable power grid system in any part of the country other than the Capital region...."

"....A recent magazine article, in response to the upcoming monsoon season, noted the deplorable history that Islandia's Dept. of Roads has in repairing the road and bridge damage inflicted by the monsoon rains. While the road system itself in Islandia is considered quite adequate, repairs to damaged roads and bridges often takes several weeks, causing excessive delays or leaving areas totally inaccessible...."

"....The most recent issue of the Asian Times carries an excerpt from a Doctors Without Borders report highlighting the serious sewer/waste disposal conditions they found in rural Islandia. Many of the large sewer pipes/drains were found to be old and leaking, and, if not repaired quickly by the government, these medical personnel felt there could be serious health issues...."

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Tagged Condition (First 12)

*** INFRASTRUCTURE ***

THIS ITEM IS RATED AS **POSITIVE** - "....The World Health Organization recently cited Islandia as an outstanding example of a nation addressing health issues. Specifically noted was the completion of their Potable Water Initiative (PWI), a three-year program directed at giving every village with a population of over 150 either a large storage supply of potable water or access to a high-output Reverse Osmosis machine to produce the required potable water supply...."

THIS ITEM IS RATED AS **POSITIVE** - "....A detailed report on both the primary and secondary roads in Islandia indicates that within and between all the major cities, almost all of the primary roads are four lanes. The vast majority of the secondary roads are good quality two-lane highways...."

THIS ITEM IS RATED AS **NEGATIVE** - "....Pacific Telecommunications reports that it has failed to come to agreement with the government of Islandia regarding establishing more telephone lines in the rural areas of the country. Aside from the Capital region, Islandia ranks as one of the worst countries in the region in terms of phones per capita and has no cellular phone system at all...."

*** LABOR POOL ****

THIS ITEM IS RATED AS **POSITIVE** - "....Last year a World Bank survey listed Islandia's labor force as having the highest literacy rate of any country in the region. This has been true for the last nine annual surveys, and it attributed to Islandia's emphasis on giving every child access to a free education...."

THIS ITEM IS RATED AS **NEGATIVE** - "....Past regional conflicts in the area have caused hostile feelings among the different cultures and countries. Some of the evacuated refugees will be from Tammni, a country that in the past has had poor relations with Islandia. Islandia workers may not be willing to work at the camp if they perceive that they are, in part, helping Tammni residents...."

THIS ITEM IS RATED AS **POSITIVE** - "....The salary and benefits paid to Islandia workers has been compared against ten other countries in the region. The findings vary as a function of the specific issue addressed, but in almost all of the comparisons, Islandia workers are in the lower half in terms of salary and benefits paid...."

Items grouped
and tagged as
Positive or
Negative
influence on
criteria.



Tagged Condition: UI items appended to end of category list

*** INFRASTRUCTURE ***

THIS ITEM IS RATED AS **POSITIVE** - "...The World Health Organization recently cited Islandia as an outstanding example of a nation addressing health issues. Specifically noted was the completion of their Potable Water Initiative (PWI), a three-year program directed at giving every village with a population of over 150 either a large storage supply of potable water or access to a high-output Reverse Osmosis machine to produce the required potable water supply...."

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Hidden Profile



Experimental Hypotheses

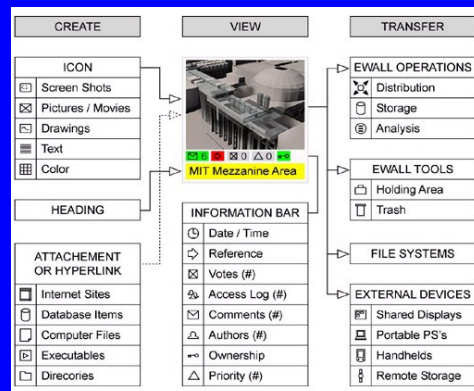
- **List condition**
 - Will not detect the hidden profiles
 - Least accurate scoring of criteria
 - Low confidence
 - Longest completion time
- **Tagged condition**
 - Will detect the hidden profiles
 - Most accurate scoring of criteria
 - Highest confidence
 - Shortest completion time
- **Grouped Condition**
 - Middle range between List and Tagged conditions



Additional FY03 Work

Optimized KE techniques/displays:

What information is required,
how should it be elicited?



Five Criteria

	A1	A2	A3	A4	A5
P1	Red	Yellow	Red	Grey	Yellow
P2	Teal	Teal	Cyan	Yellow	Grey
P3	Grey	Yellow	Grey	Grey	Grey
P4	Teal	??	Teal	??	Red
P5	Cyan	Cyan	Cyan	Teal	Cyan

Interface/displays for
group consensus building

Compatibility with, leveraging of
EWALL technologies



Presentations/Publications

- Fleming, R. Use of Shared and Uniquely Held Information in a Distributed Collaborative Environment. Paper presented at HFE TAG, June 2002
- Fleming, R. A 'Tag and Release' Approach to Information Exchange in Crisis/Disaster Situations. Paper Presented at HFE TAG, June 2002
- Fleming, R. Information exchange in group decision making: Review and impact on command and control. Paper Presented at HFE TAG, Nov. 2002
- Fleming, R. and Kaiwi, J. The Problem of Unshared Information in Group Decision-Making: A Summary of Research and a Discussion of Implications for Command and Control. SSC-SD Technical Document 3149, July, 2002



References/Bibliography

- Large Bibliography included in SSC-SD Technical Report:

Fleming, R. and Kaiwi, J. The Problem of Unshared Information in Group Decision-Making: A Summary of Research and a Discussion of Implications for Command and Control. SSC-SD Technical Document 3149, July, 2002

Asynchronous Collaboration

Time

